



WEST SANTA ANA BRANCH

Initial Screening Results

November 2010

www.pacificelectriccorridor.com



SOUTHERN CALIFORNIA
ASSOCIATION of GOVERNMENTS

www.scag.ca.gov



WEST SANTA ANA BRANCH

Overview of Presentation

Starting Initial Screening Discussion with Overview of:

- Purpose and Need Findings
- Description of Initial Set of Alternatives
- Initial Screening Results

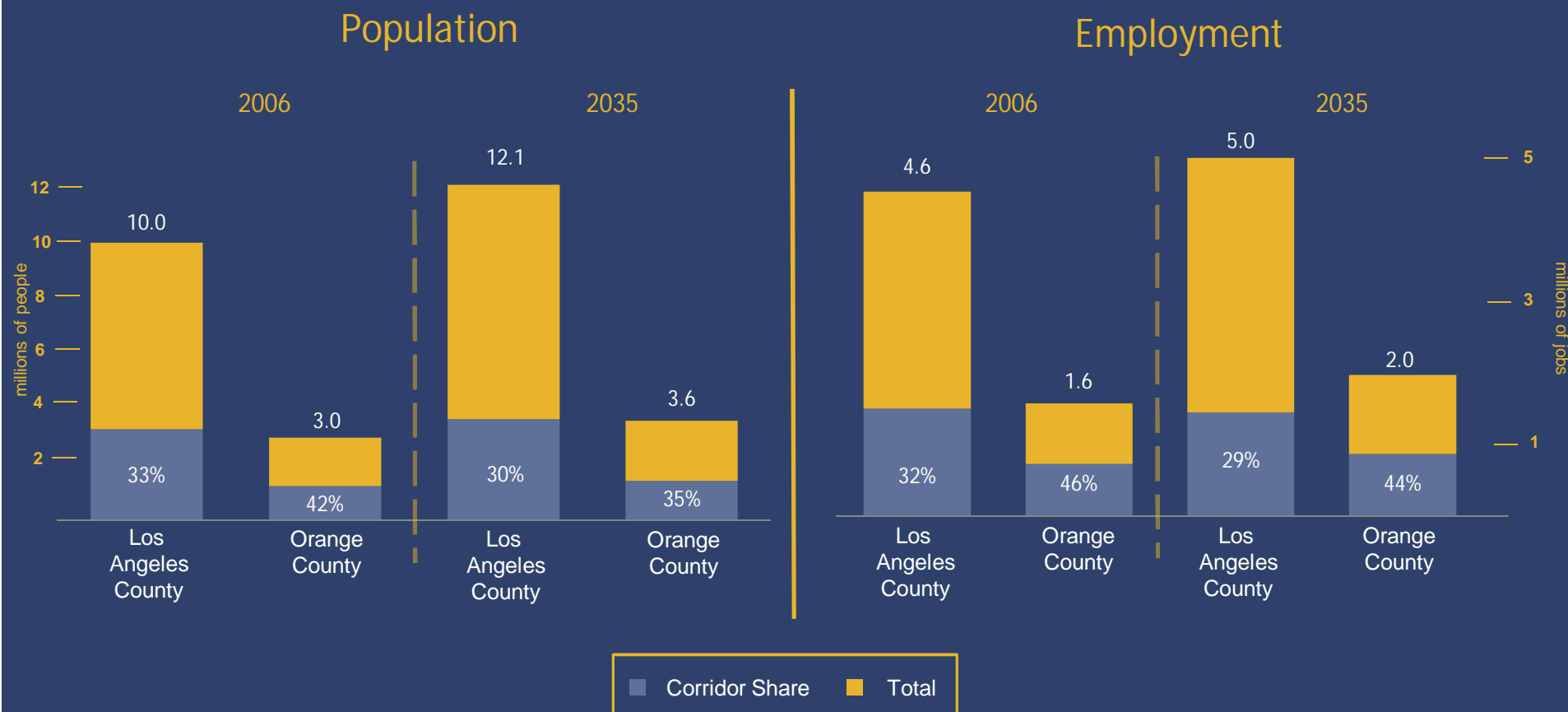
Decision on Final Set of Alternatives: January 2011



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Why This Corridor?

Large share of regional population and employment

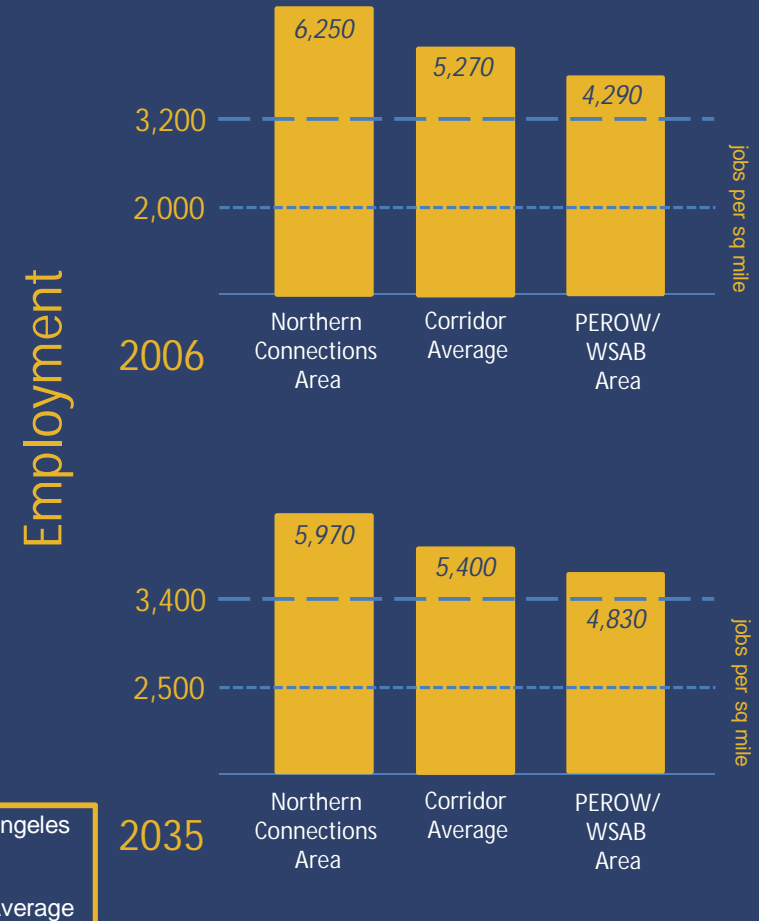
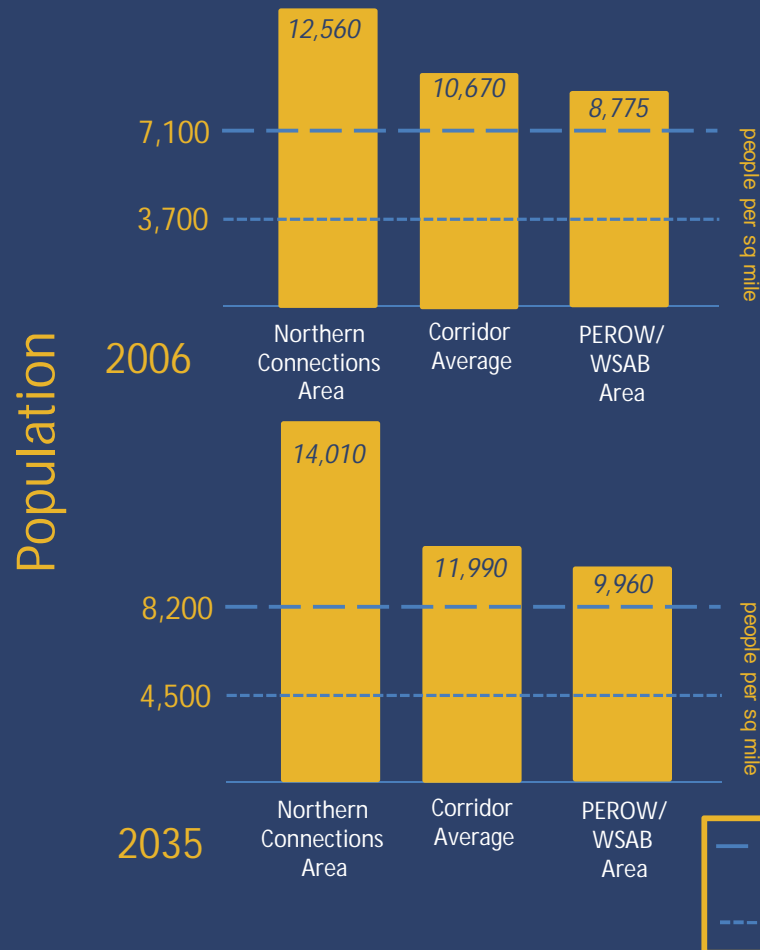




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Why This Corridor?

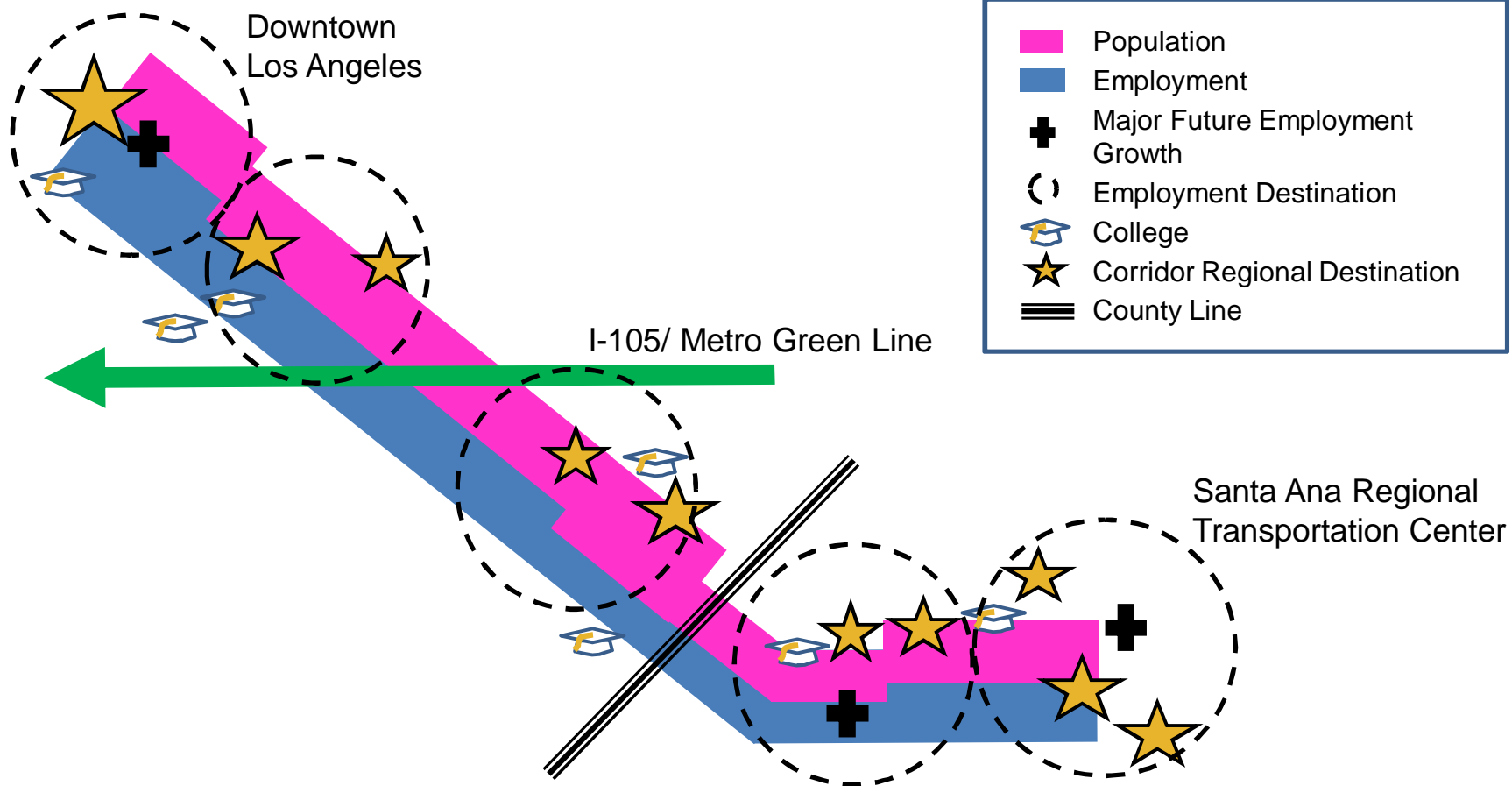
Existing and future high population and employment densities





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Overview of Corridor





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Transportation System Challenges

From a transportation system perspective:

- Corridor highway system operates at-capacity and beyond today and in the future
- Corridor residents lack connections to the regional transit system and have few travel options
- Corridor transit system operates at-capacity and beyond in some areas
- Corridor contains a significant low income/transit dependent population



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Investment Benefits

A high capacity transportation system improvement would:

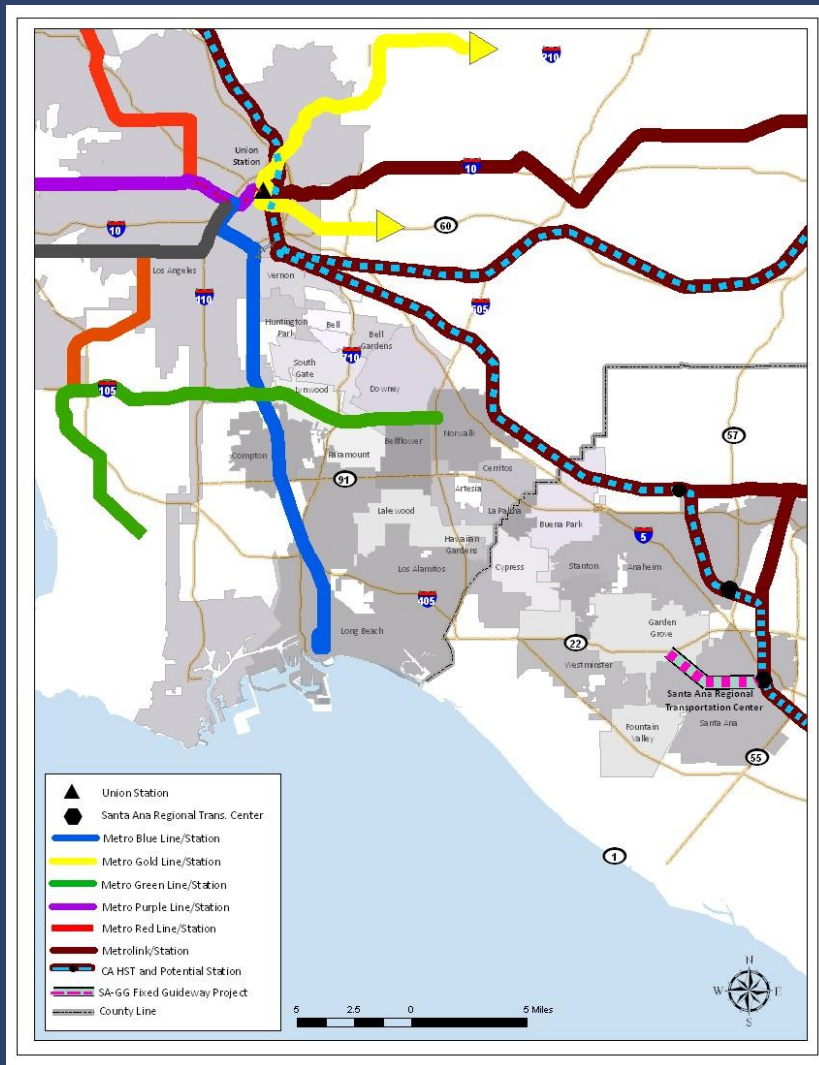
- Provide a new, faster travel option
- Provide connections to the regional transportation system
- Improve access to corridor activity centers
- Support local plans for economic development and community revitalization





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Potential Corridor System





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Alternatives Considered



No Build Alternative



TSM Alternative



Bus Rapid Transit (BRT)



Street Car (STCR)



Light Rail Transit (LRT)



Diesel Multiple Unit (DMU)



High Speed Rail (HSR)
-Conventional
-Maglev





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Bus Rapid Transit Alignments



Trips

Serves regional and local trips

Speed

Street-running (10-14 mph)
HOV (25-35 mph)
Speed constrained by peak period congestion

Station Spacing

1.0 mile between stations

Land Use Plans

Support for development/revitalization plans proven internationally (Canada, Australia)





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Rail Alternative Alignments



Trips	Serves regional and local trips
Alignment	Use RR ROW with temporal separation or provide 3 tracks
Speed	Provides a low to medium speed: 8.5 - 15 mph (Streetcar); 25-35 mph (LRT); 25-55 mph (DMU)
Station Spacing	0.2-0.5 miles between stops (Streetcar) 1-1.5 miles (LRT); 1.5-3.0 miles (DMU)
Land Use Plans	Demonstrated support for development/revitalization plans





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High Speed Rail Alignment



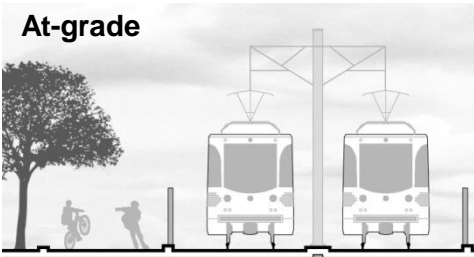
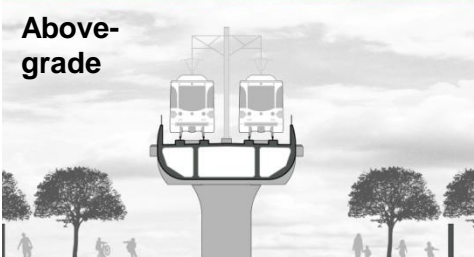

Trips	Serves regional trips
Alignment	Requires separate ROW for Northern Connection area
Speed	Provides high speed of 110-220 mph
Station Spacing	10-20 miles between stations
Land Use Plans	Demonstrated support for high density development nationally (Conventional) and internationally (Conventional & Maglev)





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Vertical Alignments

Alignment	BRT	Streetcar	Light Rail	Diesel Multiple Unit	High Speed Rail
At-grade 	✓	✓	✓	✓	—
Above-grade 	✓	✓	✓	✓	✓
Below-grade 	—	✓	✓	—	✓





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Potential Stations

Station locations for Initial Screening (east bank of Los Angeles River only):

BRT, Streetcar, LRT, DMU Options

City	Station
Los Angeles	Union Station
	Soto/Olympic
Vernon/Maywood	Leonis/District Blvd.
Huntington Park	Gage or Florence Ave.
South Gate	Firestone Blvd.
	Gardendale Blvd.
Paramount	Paramount Blvd.
Bellflower	Bellflower Blvd.
Cerritos	Studebaker Rd.
Artesia	Pioneer Blvd.
Cypress/Buena Park	Cypress College
Stanton	Beach Blvd.
Garden Grove	Brookhurst St.
	Harbor Blvd.
Santa Ana	Bristol St.
	Santa Ana RTC

HSR Conventional

City	Station
Los Angeles	Union Station
Paramount	Metro Green Line
Cerritos	Studebaker Rd.
Stanton	Beach Blvd.
Santa Ana	Santa Ana RTC

HSR Maglev

City	Station
Los Angeles	Union Station
Paramount	Metro Green Line
Stanton	Beach Blvd.
Santa Ana	Santa Ana RTC





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Initial Screening Criteria

Initial set of alternatives evaluated based on:

- Public and Stakeholder Input
- Mobility Improvements including ridership and travel speed
- Support for development/revitalization plans
- Environmental Impacts
- Engineering and Operating Viability





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Public and Stakeholder Input

Input provided through:

Advisory committees

October/November/January

Community meetings

November/December

Elected Official/Stakeholder briefings

October-January

Public presentations

October-December

Public comments

October-December





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Travel Speeds

Resulting Speed based on:

- Station spacing
- Operational capabilities
- Mode-specific design requirements
- At-grade or grade-separated operations

	BRT	STCR	LRT	DMU	Conventional	HSR Maglev
At-Grade	10-14	8.5-15	25-35	25-35	-	-
Grade-Separated	25-35	25-40	45-55	45-55	110-220	150-270+



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Conceptual Ridership

Range of possible Daily Boardings based on:

- Similar projects
- Proposed alignments and station spacing

	BRT	RAIL	HSR
Conceptual Ridership	19,200-32,400	26,000-57,600	2,400-4,800





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Conceptual Cost to Build

Order-of-Magnitude Construction Costs*

Union Station to Santa Ana Regional Transportation Center
(2010\$, billions)

	BRT	STCR	LRT	DMU	HSR	
					Conventional	Maglev
At-Grade	\$0.60	\$1.30	\$1.60	\$1.22	-	-
Above-Grade	\$2.18	\$3.95	\$4.21	\$4.11	\$4.91	\$5.94
Below-Grade	**	\$9.81	\$10.61	**	\$13.35	\$14.01

* These costs are conceptual order of magnitude estimates

** Typically not done due to ventilation issues





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Funding Sources

Possible Funding:

Los Angeles County
Measure R Funds *

\$649 million

Other Funding
(50 percent match from local,
regional, state, and federal)

+ \$649 funding

Projected Available Funding

\$1,298 billion

* LACMTA 2009 LRTP, escalated to year of expenditure (2027)



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Conceptual Cost To Operate and Ride

Annual Cost to Operate (\$2010)

	BRT	Street Car ²	LRT ¹	DMU	High Speed Rail ³
Cost Per Service Hour	\$80-120	\$140-150	\$160-250	\$250-300	\$2,500-3,000

Current/Forecast Fare

Fare Per One-Way Trip	\$1.50	\$2.05	\$1.50	\$2.00	\$50-55*
	Metro Orange Line	Portland, West Sacramento	Metro Gold Line	NCTD Sprinter	Amtrak Acela

¹ Metro Eastside Phase 2 Preliminary Operating Costs Technical Memorandum

² Portland Streetcar Operating & Maintenance Division

³ SCAG High Speed Regional Transportation Alternative Analysis, Alternative Analysis

Note: Operating Cost stated as being within 5% for Maglev & Steel Wheel HSR Systems

* Baltimore to Washington, DC





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Conceptual Cost Per Rider

Order-of-Magnitude Cost Per Rider*

Union Station to Santa Ana Regional Transportation Center
(2010\$, billions)

Conceptual Annual Cost Per Rider	BRT	STCR	LRT	DMU	HSR	
					Conventional	Maglev
	\$20-50	\$10-40	\$10-50	\$10-50	\$460-920	\$580-1150

* These costs are conceptual order of magnitude estimates



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Environmental Concerns

Key environmental and community impacts identified by the public and stakeholders:

- Noise and Vibration
- Air Quality
- Visual and Privacy
- Traffic Impacts
- Property Acquisition





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Noise and Vibration Impacts

Average 24-hour Noise Exposure¹:

Noise (dBA)	Hwy 4 lanes	BRT ^{2,3}	STCR ³	LRT ³	DMU ³	HSR	
						Conventional	Maglev
	79	63/65	64	64	65	71	64

¹ Represents conditions with no noise mitigation measures

Source: FTA

² Represents electric/diesel buses.

³ Represents operation noise only; noise from bells, horns, and warning gates to be identified when more detailed design information is available. (Metro Gold Line = 67 – 76 dBA, Freight = 90 – 110 dBA)

Vibration Impacts:

Vibration Category	Hwy 4 lanes	BRT	STCR	LRT	DMU	HSR	
						Conventional	Maglev
	1	1	1/2	3	4/5	5	4/5

1. Rubber tire systems

Source: FTA

2. Lighter, smaller/weight steel-wheel vehicles; low operating speeds

3. Medium-sized/weight steel-wheel vehicles coupled together; medium speed

4. Heavier-weight, larger vehicles; faster operating speeds

5. Locomotive-operated systems; fastest operating speeds

Categories 3-5 may require vibration mitigation





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Air Quality

Air Quality Benefits

	No Build	BRT	STCR	LRT	DMU	HSR	
						Conventional	Maglev
Regional Emissions	Base	Yes	Yes ¹	Yes ¹	Yes/No ²	Yes ¹	Yes ¹
Local Emissions	Base	Yes ³	Yes	Yes	No	Yes	Yes
Carbon Monoxide	Base	Yes ³	Yes	Yes	No	Yes	Yes
Toxics	Base	Yes ³	Yes	Yes	No	Yes	Yes
Greenhouse Gases	Base	Yes	Yes	Yes	Yes	Yes	Yes

¹ Assumes electrical power meets California Renewables Portfolio Standard (RPS).

² Provides benefits over No Build conditions, minor increase in regional emissions from clean diesel operations

³ Assumes buses run on natural gas or other alternative fuel, rather than diesel.

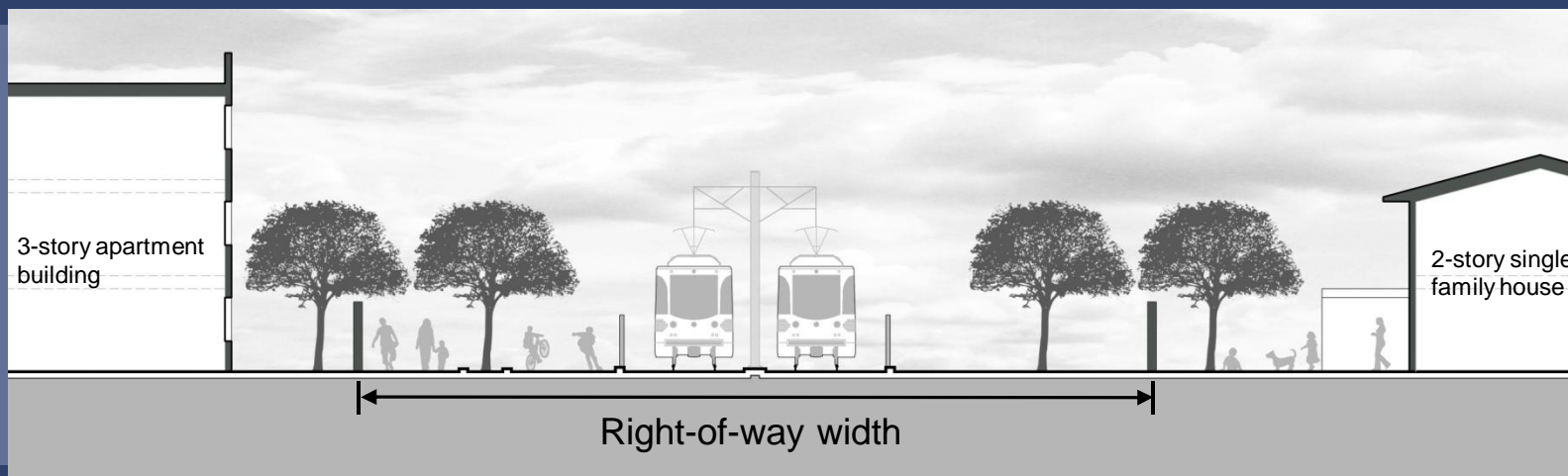




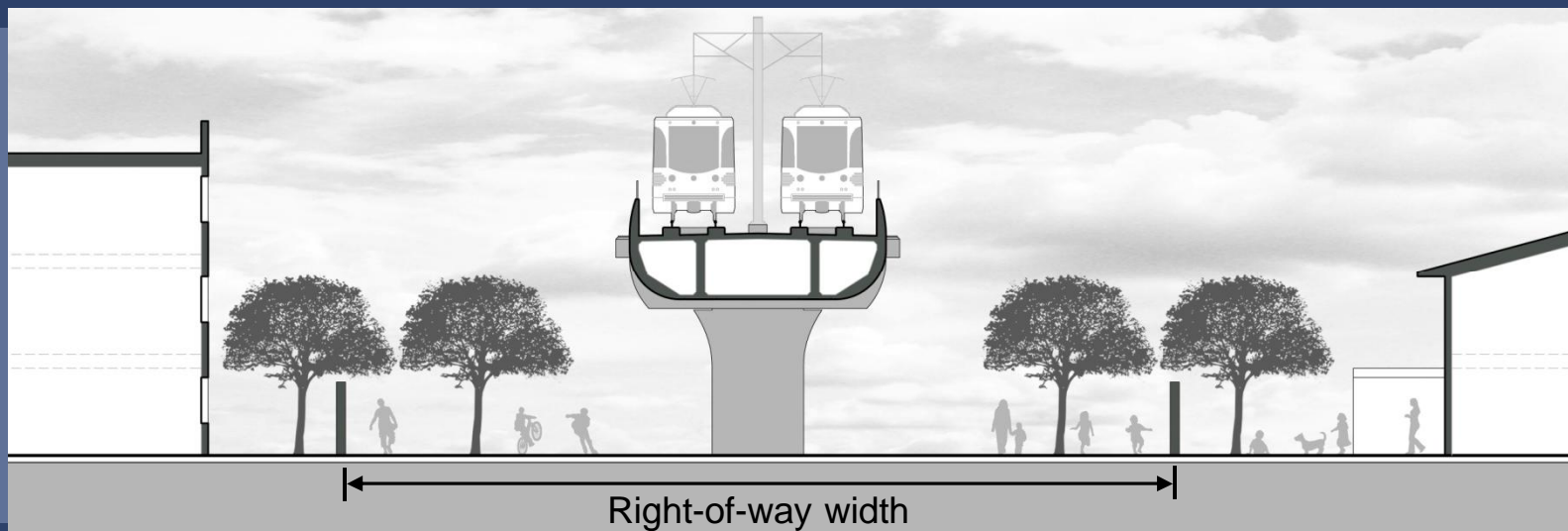
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Visual and Privacy

At-Grade



Above-Grade





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Traffic Impacts

Summary of possible traffic impacts:

- At-grade operational impacts include:
 - Traffic signal cycle changes
 - Queuing and capacity impacts
 - On-street parking impacts
 - Bikeway and pedestrian safety
- Above-grade operational impacts due to columns:
 - Visual and safety impacts
 - Capacity, left turn lanes, and parking impacts
- Unique diagonal street crossings will increase traffic impacts





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Property Acquisition

Acquisition may be required for:

- Stations, bus/shuttle transfer, parking, and other facilities
- Alignment/System requirements

Possible Acquisition (parcels) Along PE ROW from Metro Green Line to Santa Ana RTC

BRT	STCR	LRT	DMU	Conventional	HSR Maglev
—	—	Less than 10	Less than 10	More than 100	More than 100

Acquisition requirements from Metro Green Line north to Downtown Los Angeles to be identified in next study phase



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Engineering and Operational Viability

Evaluated during Initial Screening:

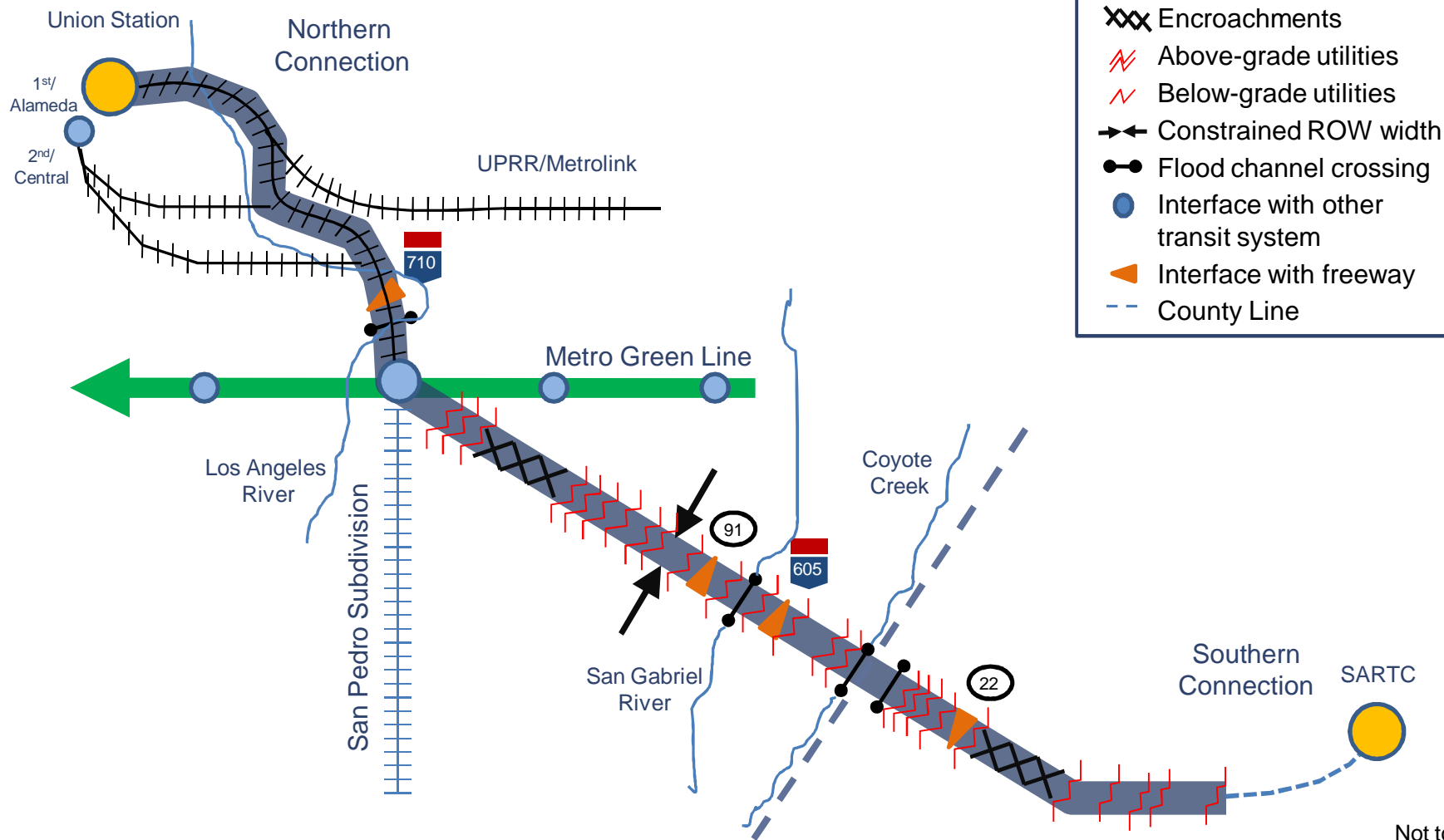
- Right-of-Way Constraints
- Northern Connection Solution
- Southern Connection Solution
- Operating Viability





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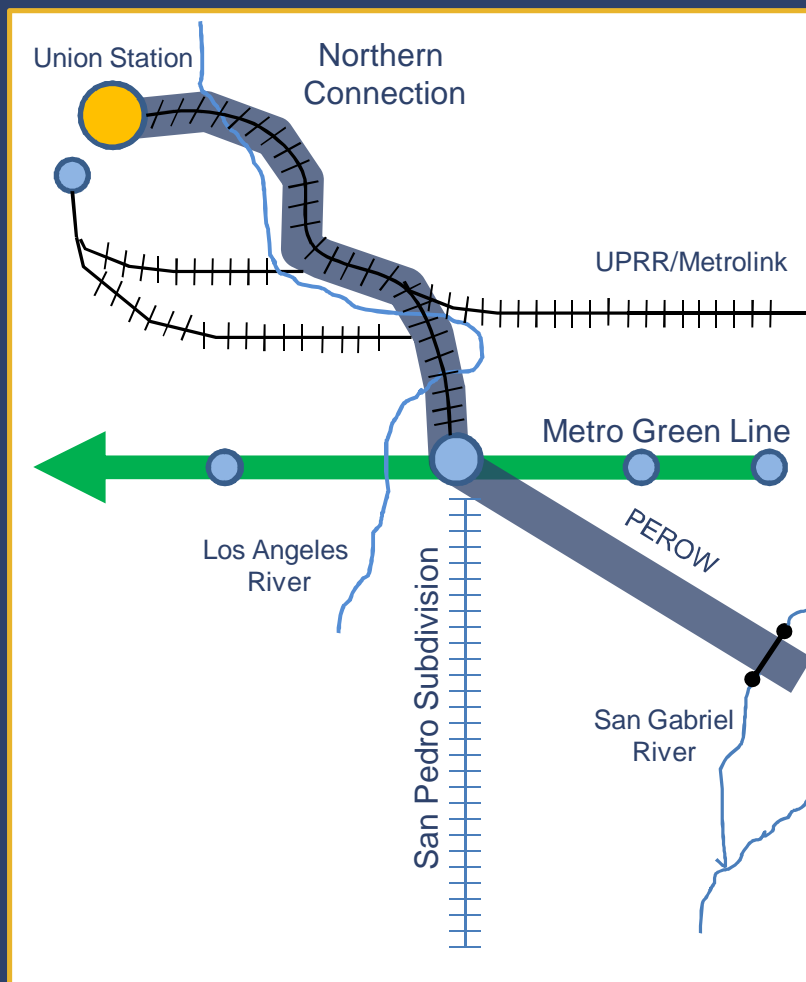
PEROW Constraints





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Northern Connection Challenges

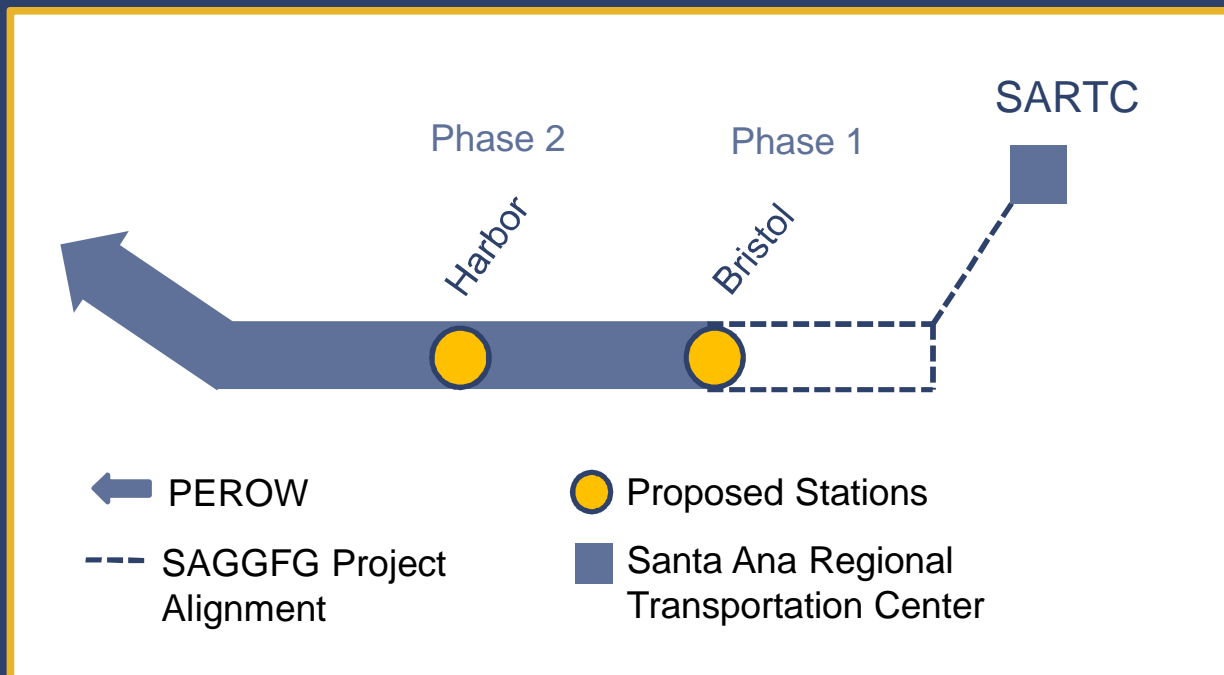


- Compatibility with:
 - Freight rail operations
 - Metrolink and CAHST service
 - Metro Green Line
- Multiple approving/cooperating agencies
- Limited track capacity from UPRR/Metrolink tracks into Union Station
- Fit with city street operations with high truck volumes



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Southern Connection Challenges



SAGGFG Project Schedule

Complete	Date
Evaluation of Final Alternatives	Spring 2011
Draft Environmental Document	Summer 2011
Preliminary Engineering	Spring 2012
Phase I Construction	Winter 2014/ Spring 2015
Phase II Construction	Fall 2020

Fit with Santa Ana-Garden Grove Fixed Guideway Project:

- Study and implementation timeframe
- Fit with planned modes





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Outstanding Engineering Issues

Addressed during Final Screening efforts:

- Design of alignment, stations and related pedestrian/bicycle facility
- Design of vertical alignment – best combination of at-grade and grade-separated operations
- Work on resolving Northern Connection Issues
- Assess fit with other system plans – Ports/ACTA, UPRR, Metrolink, CAHST, SA-GGFG Project and Union Station/Downtown Los Angeles





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Operating Viability

Operating Assessment

	BRT	STCR	LRT	DMU	HSR	
					Conventional	Maglev
Metro/OCTA System Fit	✓	*	✓	No existing entity		No existing entity
CAHST System Fit					✓	No
Domestic Revenue Service	✓	✓	✓	✓	✓	Not yet
Can meet Federal "Buy America" Requirements	✓	✓	✓	✓	✓	Not yet

* May fit with future SAGGFG project operations





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Initial Screening Summary

	BRT	STCR	LRT	DMU	HSR	
					Conventional	Maglev
Serves: Local trips	✓	✓	✓	✓		
Regional trips	✓		✓	✓	✓	✓
Provides support for local plans	*	✓	✓	*	*	*
Requires Acquisition	Minimal	Minimal	Minor	Minor	Major	Major
Has Air Quality Benefits	Yes	Yes	Yes	No**	Yes	Yes
Fit with current system plans	✓	✓	✓	No	No	No
Has State and Federal approved vehicles/system	✓	✓	✓	✓	✓	Not Yet
Conceptual Ridership	19,200-32,400	26,000-39,000	26,000-57,600	26,000 - 57,600	2,400-4,800	2,400-4,800
Conceptual Cost to Build (\$2010, billions)	\$0.6-2.2	\$1.3-4.0	\$1.6-4.2	\$1.2-4.1	\$4.9	\$5.9
Conceptual Annual Cost Per Rider	\$20-50	\$10-40	\$10-50	\$10-50	\$460-920	\$580-1,150

* Proven nationally and internationally

** Some regional benefits





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Final Set of Alternatives

In January, 2 alternatives identified for further study based on:

- Meets Project Purpose and Need
- Appears viable from cost/ridership, funding, engineering, operating and environmental perspective
- Has public/stakeholder support (meets local goals)





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Decision-Making Criteria

Criteria used to identify final Locally Preferred Alternative:

Metro/OCTA

- Fit within financially constrained LRTP's
- Stakeholder/public support
- Fit within developing regional transportation system

Cities

- Supports local development/revitalization plans
- Provides transportations improvement
- Has minimal community impacts

FTA

- Funding and operating viability
- Cost-Effectiveness
- Livability issues – economic development opportunities and environmental benefits





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Next Steps

Steering Committee Discussion

November 2010

Community Meetings

November 2010
December 2010

Technical Advisory Committee
Discussion

January 2011

Steering Committee
Recommendation
On Final set of Alternatives

January 2011

